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June 19, 2008

BROWN AND CALDWELL

Ms. Anne Olson, P.E.
Water Resources Control Engineer
California Regional Water Quality Control Board
11020 Sun Center Drive, Suite 200
Rancho Cordova, California 95670

1017/135632-004

Subject: Response to Tentative WDRs,
Syngenta Seeds, Woodland, California

Dear Ms. Olson:

Brown and Caldwell is submitting this letter on behalf of Syngenta Seeds in response to the May 16, 2008 Tentative Waste Discharge Requirements prepared by the Regional Water Board.

The following comments and recommendations relate to the findings and specifications stated in the tentative order.

Pg.3, Item #11 - Land Application Area Expansion

If necessary to comply with organic, nitrogen, and salinity loading limits, Syngenta Seeds will increase the available area for land application of process water. The existing land application area will be increased, as necessary, up to a maximum area of three acres. Proceeding each process season, the land application operations will be reviewed, and if deemed necessary, additional checks and sprinkler irrigation assemblies will be added prior to the next season.

The proposed flow limit of 493,000 gallons spread over three acres would result in a hydraulic loading of 6 inches of water each year. Based on a wastewater flowrate of 493,000 gallons per year averaged over 49 days of operation, an average BOD concentration of 944 mg/L (historical average), and a typical 8-day application cycle, the cycle average BOD loading would be approximately 26 pounds per acre per day, and the peak (or instantaneous maximum) BOD loading would be approximately 634 pounds per acre per day.

Incorporating the additional acreage, up to a maximum area of three acres, would ensure that the proposed maximum day BOD loading rate of 800 pounds per acre

will not be exceeded, especially due to the high variability in BOD concentrations measured over the last three processing seasons.

Pg.7, Item #30 – Supply Well Analytical Data

Process water is supplied from an on-site well. The summary of analytical results in the tentative order should be updated to include all samples collected from the on-site well through 2007. A summary of historical analytical results from the on-site well are provided in Attachment A.

Pg.9, Item #32 – Groundwater Monitoring Requirement

This finding indicates that the groundwater quality beneath the site exceeds water quality objectives for electrical conductivity, dissolved solids, nitrate nitrogen, and sodium and is likely due to agricultural practices in the area. In addition, the finding states that the discharge has the potential to further degrade groundwater quality due to high concentrations of salinity and nitrogen. Consequently, the Regional Water Board is requiring groundwater monitoring wells to be installed to monitor groundwater up- and down-gradient of the land application site.

Syngenta proposes to commit to an annual soil sampling program in lieu of installing and monitoring groundwater monitoring wells. Soil sampling will be used to monitor the effects of wastewater application, observe the transport of salinity and nitrogen constituents, and confirm that the land application process does not have the potential to degrade the groundwater quality underlying the site.

<u>Soil Sampling – Locations, Depths, Constituents</u>

After each processing season in the fall, Syngenta will conduct soil sampling at three locations. Two locations will be chosen within the three-acre land application site and one location will be chosen outside of the land application area and designated as background. At each location a sample will be collected from the following three intervals: 0.5-1 foot, 2-3 foot, and 4-5 foot. Each sample will be analyzed via saturation paste extract methods for the following constituents:

pH
Soluble Salts – EC
Chloride (Cl)
Calcium (Ca)
Magnesium (Mg)
Sodium (Na)
Sodium Adsorption Ratio (SAR)
Total Nitrogen
Nitrate Nitrogen (NO_3-N)
Nitrite Nitrogen(NO_2-N)

Ammonia Nitrogen (NH_4-N)
Total Kjeldahl Nitrogen (TKN)
Total Dissolved Solids (TDS)

Soil Sampling Analysis – Statistical Trending and Background Concentrations

The background samples will be located at a location to the north of the land application site and will be representative of an area where typical agricultural operations occur. Comparison of results between the background and land application site samples will determine whether the land application operations are similar and safe to the typical agricultural operations in regards to the potential to degrade shallow groundwater quality.

In lieu of the *Background Groundwater Quality Report* proposed in the tentative order, Syngenta will submit a trend analysis of the soil sampling data. For each soil sampling constituent, the report will present a summary of the data from each sampling location and depth interval. The trend analysis will aid in determining whether current land application practices pose an additional threat to shallow groundwater in comparison to the typical agricultural practices conducted at the site. The analysis will summarize the background soil data collected to date and prescribe acceptable concentration ranges for the monitored constituents at the land application site that are protective of shallow groundwater. The analysis will also discuss transport of the various constituents within the soil profile.

If warranted, additional site-specific information will be provided to demonstrate that groundwater limitations higher than the effluent limitations stated in the tentative order would not reasonably impair the beneficial use of groundwater for agricultural irrigation. A May 30, 2011 submission date should allow sufficient time to collect data for the trend analysis.

Response to Potential Degradation – Re-testing and Hydropunch Sampling

If the soil sampling trend analysis or subsequent soils sampling shows that the discharge of wastewater is causing the soil to contain waste constituents in concentrations statistically higher than the background and the potential to degrade shallow groundwater quality, then Syngenta will submit a *BPTC Evaluation Workplan*, as stated on page Provision G.2 of the tentative order. The workplan will set forth a scope and schedule to evaluate sources of potential degradation and recommend active responses or remediation measures, including re-testing, hydropunch sampling, installation of monitoring wells, or changes in crop planting and harvesting operations.

Effluent Limitation C.4 and Land Application Area Specification D.3 – Harvesting of Crops

The tentative order requires that all crops shall be harvested and the cuttings removed from the land application area at least once per year. Syngenta currently cuts but does not remove the turf grass crop from the land application site. Syngenta does not have harvesting equipment for the land application area. The cost of purchasing specialized equipment for harvesting crops from the land application site can not be justified based on the small acreage. In addition, no outside party has shown interest in harvesting and removing the turf grass for Syngenta.

Syngenta proposes to manage nitrogen removal from the land application site without crop removal. At the proposed flow limit with an average total nitrogen concentration of 140 mg/L (historical average), the total nitrogen load spread over three acres would be approximately 200 pounds per acre per year.

Cutting and letting the turf grass lay, rather than removing the turf grass clippings from the land application site, will still result in some removal of nitrogen through mineralization of organic matter. As the clippings dry, approximately 60% of the plant available nitrogen can be lost due to denitrification and volatilization (pgs 41-43, Crites, et al, 2000). Example calculations of expected organic nitrogen mineralization rates are included as Attachment B.

The annual soil sampling program previously discussed will determine whether nitrogen and salinity builds up in the soil as a result of the land application process and not harvesting the turf grass regularly. If the soil sampling program determines that nitrogen and salinity are building up in the soil, changes to the cropping and harvesting operations will be considered. (Also reference Pg.3, Item#11 & pg.5, Item #17)

MRP – Supplemental Irrigation Water Monitoring

Change sampling frequency of electrical conductivity from "weekly" to "monthly" to match the sampling frequency of the other constituents.

MRP – Groundwater Monitoring

Replace groundwater monitoring requirements for the soil sampling program discussed previously.

MRP, Reporting - Monthly Monitoring Reports

Due to the short processing season (three to four months), Syngenta requests that the monthly monitoring reports not be required. During the past three processing seasons, the actual days of operation have ranged from only 28 days in 2006 to 54 days in 2005. In addition, Syngenta does not expect to have off-season processing. Therefore, monthly monitoring reports for November through June will not be required. All data requested for the monthly monitoring reports will be submitted as part of the Annual Monitoring Report.

MRP, Reporting - Quarterly Monitoring Reports

Upon approval of the soil sampling monitoring program previously discussed, the quarterly monitoring reports would not be required. Instead, annual soil sampling data summaries and interpretations of results will be incorporated in the Annual Monitoring Report.

MRP, Reporting - Annual Monitoring Report

As stated above, annual soil sampling data summaries and interpretations of results will be incorporated in the Annual Monitoring Report.

References

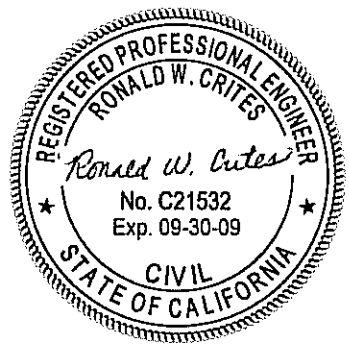
"Land Treatment Systems for Municipal and Industrial Wastes", Ron Crites, Sherwood Reed and Robert Bastian authors, McGraw-Hill, New York. 2000.

If you have any questions or comments, please call Lance Hershman at (916) 853-5375.

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this document and all attachments and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

Sincerely,

BROWN AND CALDWELL



Ron Crites, P.E.
Natural Systems Service Leader

Attachments

cc: Mr. Lance Hershman, Brown and Caldwell
Mr. Ed Schatz, Syngenta Seeds, Woodland

ATTACHMENT A

Historical Analytical Data

SYNGENTA SEEDS

HISTORIC SUPPLY WELL DATA

Sample ID	Sample Date	BOD	TDS	FDS	TSS	Chloride	Nitrate-N	Nitrite-N	Nitrate (NO_3)	TKN	NH_4-N	Sodium	Calcium	Magnesium	pH	EC	Alkalinity as $CaCO_3$	Bicarbonate as CaCO3	Hydroxide as CaCO3	Carbonate as CaCO3	Hardness as $CaCO_3$	Boron	Bromide	Fluoride	Phosphate-P	Phosphate (PO4)	Potassium	Sulfate
	Units:	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	su units	micromho/cm	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
	Method:	SM 5210B	SM 2540 D	SM 2540 E	SM 2540D	SM 4500 CL B	SM 4500-NO3E	SM 4500-NO2B	SM 4500-NO3E	SM 4500 N-C	SM 4500 NH3C	SM 3113 B	SM 3111 B	SM 3111 B	SM 4500	SM 2510A	SM 2320B	SM 2320B	SM 2320B	SM 2320B	SM 2340B	SM 4500BC	SM 4500Br B	SM 4500FD	SM 4500P E	SM 4500P E	SM 3111B	SM 4500-SO4D
	MDL:	2	10	5.0	1.0	1.0	0.05	0.02	0.2	1.0	0.1	0.05	0.2	0.05		0.001	1.0	1.0	1.0	1.0	1.0	0.2	0.1	0.1	0.01	0.0	0.2	5.0
Domestic Well	4/5/2004		646			85.6	2.7		11.9			131.0	23.63	47.19	7.36	1,010		450		1		1.86			0.11		0.03	11.16
S-1	8/25/2004	17.4	534	480		47.5	9.4		41.6	0.9	0.16	62.2	34	54.4														
SW-2005-01	9/28/2005	1	473	428	0.5	54.9	7.7		0.1	0.5	0.05	81.4	38.5	52.2	7.84	850	345	345	0.5	0.5	311.0	2.25	0.05	0.75	0.07	0.22	2.85	43.6
SW-2006-01	6/17/2006	1	535	471	0.5	49.86	6.61		29.3	0.5	0.44	80.6	33.47	57.46	7.51	1,072	345	345	0.5	0.5	83.67	1.41	0.62	0.23	0.09	0.28	1.34	46.81
SW-2007-01	8/3/2007	1	453	385	19	52.5	11.18	0.01		1.2	0.43	68.7	41.3	42.9	6.26	1,010	325	325	0.5	0.5	279.8	0.23	0.32	0.075	0.06		1.00	32.8
Minimum[1]		1	453	385	0.5	47.5	2.7	0.01	0.1	0.5	0.05	68.7	23.6	42.9	6.26	850	325	325	0.5	0.5	83.6	0.2	0.05	0.08	0.06	0.22	0.03	11.2
Maximum		17	646	480	19.0	85.6	11.2	0.01	41.6	1.2	0.44	131.0	41.3	57.5	7.84	1,072	345	450	0.5	1.0	311.0	2.3	0.62	0.75	0.11	0.28	2.85	46.9
Average[1]		5	528	441	6.7	58.1	7.5	0.01	20.7	0.8	0.27	88.9	34.2	50.6	7.25	988	338	366	0.5	0.6	224.8	1.4	0.40	0.35	0.08	0.25	1.31	33.6

Notes: MDL - Method Detection Limit

BOLD - Not Detected above MDL. Reported as one-half the MD

[1] Non-detects reported as one-half the MDL.

SYNGENTA SEEDS

HISTORIC EFFLUENT DATA

SOUTHERN SEED EXTRACTION AND WASHING AREA

Sample ID	Sample Date	BOD	TDS[1]	FDS	TSS	Chloride	Nitrate-N	Nitrate (NO_3)	Nitrite-N	TKN	NH_4-N	Total Nitrogen	Sodium	Calcium	Magnesium	pH	EC	Alkalinity as $CaCO_3$	Bicarbonate as CaCO3	Hydroxide as CaCO3	Carbonate as CaCO3	Hardness as $CaCO_3$
	Units	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	std. units	umhos/cm	mg/L	mg/L	mg/L	mg/L	mg/L
	Method#	SM 5210B	SM 2540-D	SM 2540 E	SM 2540	SM 4500 CL B	SM 4500-NO3E	SM 4500-NO3E	SM4500-NO2B	SM 4500-N C	SM 4500-NH3C	calculated	SM 3113 B	SM 3111 B	SM 3111 B	SM 4500B	SM 2510A	SM 2320B	SM 2320B	SM 2320B	SM 2320B	SM 2320B	SM 2510A
	MDL	0.2	1.0	6.0	1.0	1.0	0.2	0.2	0.02	1.0	0.1	--	0.05	0.2	0.05	--	0.001	1.0	1.0	1.0	1.0	1.0
S-2005-1	6/5/2005	109	7,893	556	370	70.0	0.1	0.1		20	26.6	20	59.50	35.7	56.0	5.90	1,770	135	135	0.5	0.5	320
S-2005-2	6/11/2005	150	4,003	2,246	392	829.7	58.1	257		78	17.9	136	86.90	59.5	69.8	2.43	3,647	0.5	0.5	0.5	0.5	436
S-2005-3	6/19/2005	166	2,210	1,450	163	80.0	39.14	173		118	44.8	157	78.15	50.0	55.6	7.38	1,162	275	275	0.5	0.5	354
S-2005-4	6/25/2005	1,316	1,984	661	450	55.0	8.4	37.2		132	15.7	140	75.70	41.2	61.1	7.03	1,019	350	350	0.5	0.5	354
S-2005-5	9/1/2005	1,332	1,822	810	203	219.0	8.6	38.1		90	47	98	135.30	50.0	58.1	6.15	1,436	195	195	0.5	0.5	364
S-2005-6	9/6/2005	582	1,016	587	106	119.9	8.5	37.6		45	10	53	116.40	38.1	55.0	7.55	1,280	365	365	0.5	0.5	365
S-2005-7	9/16/2005	359	761	579	114	49.9	0.1	0.1		41	10.6	41	67.70	35.5	52.6	7.59	964	345	345	0.5	0.5	305
S-2005-8	9/26/2005	1,480	4,298	829	2,649	144.9	8.0	35.5		188	5.6	196	106.00	40.6	68.5	4.67	1,590	0.5	0.5	0.5	0.5	383
S-2006-1	8/17/2006	558	3,793	1,757	383	54.98	1.88	8.32	0.01	74	23.95	75	73.50	34.28	57.63	7.27	928	365	365	0.5	0.5	86
S-2006-2	8/24/2006	488	1,116	537	175	989.7	1.06	8.32	0.01	92	19.0	93	68.54	47.05	62.04	7.44	1,155	241	241	0.5	0.5	117
S-2006-3	8/30/2006	1,131	4,760	1,147	119	57.48	1.9	8.36	0.01	174	34.7	175	69.97	50.12	156.2	5.69	975	183	183	0.5	0.5	125
S-2006-4	9/7/2006	395	1,216	649	59	254.92	1.4	6.29	0.01	39	1.11	40	137.26	48.82	62.41	6.47	1,432	224	224	0.5	0.5	122
S-2006-5	9/14/2006	1,107	5,009	1,524	222	72.47	17.22	76.26	1.8	269	69.62	288	64.67	46.67	70.05	6.20	1,577	300	300	0.5	0.5	117
S-2006-6	9/20/2006	315	855	492	966	66.2	16.7	74.1	0.35	42	9.47	59	107	49.3	67.9	7.30	1,036	312	312	0.5	0.5	123
S-2006-7	9/28/2006	2,489	4,182	1,313	938	152.4	16.9	66.7	1.9	312	52.9	331	109.4	57.4	74.8	5.50	2,005	243	243	0.5	0.5	143
S-2006-8	10/11/2006	387	750	476	185	62.48	16.9	74.86	0.005	39	13.92	56	65.04	39.22	60.25	6.83	1,102	392	392	0.5	0.5	98
S-2006-9	10/17/2006	652	1,266	596	713	121.2	11.5	50.94	0.83	134	14.48	146	66.77	46.79	60.36	7.54	1,167	254	254	0.5	0.5	117
S-2007-1	8/3/2007	292	639	471	60	60	2.85		0.01	145	7.69	148	71.4	37.3	44.1	6.37	1,096	360	360	0.5	0.5	275
S-2007-2	8/8/2007	1,148	1,383	856	739	189.9	1.9		0.01	307	67.54	309	68.7	32	47.5	5.66	2,347	175	175	0.5	0.5	276
S-2007-3	8/15/2007	469	4,026	816	152	62.5	0.38		0.01	109	49.9	109	59.6	40.3	43.88	6.41	1,008	333	333	0.5	0.5	281
S-2007-4	8/22/2007	269	3,070	1,177	1,815	235	0.36	1.59	0.01	265	98	265	79.7	22.1	34.6	3.90	1,730	0.5	0.5	0.5	0.5	55
S-2007-5	8/31/2007	3,693	3,616	964	942	127.5	0.4	1.8	0.01	192	37.4	193	79.7	42.4	69.6	4.92	1,580	390	390	0.5	0.5	106
S-2007-6	9/5/2007	2,873	2,093	961	783	156	0.72	3.18	0.01	186	41.2	186	69.9	47.2	64.3	5.53	1,383	114	114	0.5	0.5	118
S-2007-7	9/26/2007	520	950	532	456	73.3	0.44	1.95	0.01	43	11.4	44	102.4	49.7	56.3	7.23	1,171	370	370	0.5	0.5	124
S-2007-8	10/9/2007	1,274	941	600	752	69.5	2.6	12.4	0.01	107	34.9	110	133.3	32.8	59.8	5.81	1,414	460	460	0.5	0.5	82
Minimum[2]		109	639	471	59	50	0.1	0.1	0.01	20	1	20	60	22	35	2.43	928	0.5	0.5	0.5	0.5	55
Maximum		3,693	7,893	2,246	2,649	990	58	257	1.92	312	98	331	137	60	156	7.59	3,647	460	460	0.5	0.5	436
Average[2]		944	2,546	904	556	175	9	44	0.29	130	31	139	88	43	63	6.19	1,439	255	255	0.5	0.5	210

Notes: MDL - Method Detection Limit.

BOLD - Not Detected above MDL. ND values counted as half the MDL for caculation of average.

Italic - Nitrate (NO_3) values in italic were not reported by the laboratory. These values were calculated as 4.43xNO-N.

[1] High content of dissolved solids reported due to presence of organic compounds.

[2] Non-detects reported as one-half the MDL.

ATTACHMENT B

Organic Nitrogen Mineralization Rate Calculations

ATTACHMENT B

Organic Nitrogen Mineralization Rate Calculations

Reference: "Land Treatment Systems for Municipal and Industrial Wastes", Ron Crites, Sherwood Reed and Robert Bastian authors, McGraw-Hill, New York. 2000. pgs 41-43.

Land Application Area = 3 acres
Total Nitrogen Applied = 200 lbs/(ac-yr)
Plant Available Nitrogen = 83% of Total Nitrogen Applied = 166 lb/(ac-yr)
Turf Grass Total Nitrogen Requirement = 225-260 lb/yr
Mineralization Rates for Anaerobically Digested Organic Matter from Table 3.12 (Time after biosolids application, mineralization rate): 0-1 yr, 30%; 1-2 yr, 10%; 2-3 yr, 5 %; 3-4 yr, 3%.

Assume the turf grass grown on the land application area is cut but not removed from the site annually. Conservative assumption is to use anaerobically digested sludge rates from Table 3.12 and to assume that all of the nitrogen is in the organic form.

Determine amount of nitrogen returned to the soil each year from the cut grass and net removal of nitrogen originally taken up by the grass due to mineralization process:

1. In first year:		
1st year cutting	166 lb/ac * 0.30	= 50 lb/ac
2. In second year:		
2nd year cutting	166 * 0.30	= 50 lb/ac
1st year residual	(166-50) * 0.10	= 12 lb/ac
	Total 2nd year	=62 lb/ac
3. In third year:		
3rd year cutting	166 * 0.30	= 50 lb/ac
2nd year residual	(166- 50) * 0.10	= 12 lb/ac
1st year residual	(166- 62) * 0.05	= 5 lb/ac
	Total 3rd year	=67 lb/ac
3. In fourth year:		
4th year cutting	166 * 0.30	= 50 lb/ac
3rd year residual	(166- 50) * 0.10	= 12 lb/ac
2nd year residual	(166- 62) * 0.05	= 5 lb/ac
1st year residual	(166- 67) * 0.03	= 3 lb/ac
	Total 4th year	=70 lb/ac

Amount of nitrogen contributed from cuttings becomes relatively stable after fourth year and increases only slightly thereafter. Approximately 70 lb/ac of nitrogen is returned to the soil each year from the grass cuttings. Therefore, net removal is approximately 60% of the plant available nitrogen.